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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/555,908	06/06/2000	KAZUMASA TAKEMURA	FURUP101US	9629

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EXAMINER

FAULK, DEVONA E

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 11/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/555,908

Applicant(s)

TAKEMURA ET AL.

Examiner

Devona E. Faulk

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 24 is/are rejected.
- 7) ☐ Claim(s) 15-23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 June 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09555908.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5,7,8,10,11,14 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayakawa (JP 6165298) in view of Aarts et al. (U.S. Patent 6,084,970).

Regarding claim 1, Hayakawa discloses a sound reproduction apparatus comprising recording sound B1 and B2; a first passenger (L1) and a second passenger (L2); three loudspeakers (3a, 3b, 3c) located in a line with passenger L1 front left and right together with passenger L2 front left and right with 3b being the center speaker (See Figure 8) which all reads on "placing the front left speaker and the front center speaker respectively to front left side and front right side of the first listener", "placing the front right speaker respectively to a front left side and a front right side of the second listener", and "arranging the front left speaker and the front right speaker symmetrically with respect to a central axis extending from the front center speaker and to the middle point between the first listener and the second listener symmetrically with respect to the central axis; a reverse filter network (5) including transfer characteristics H11, 12, H21, and H22 that interposes between the sound information recording means and the sound production means and cross-talk between these sound production means and audience could be eliminated based on is based on sound transfer characteristic between two or more loudspeakers which reads on "performing virtual localization processing to a given surround signal so as to

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produce a signal for creating virtual sound sources, and supplying the produced signal to the front left speaker, the front center speaker, and the front right speaker". Although, Hayakawa teaches on the above elements he fails to disclose a surround left sound source and a surround right sound source. However, the concept of a surround left channel and a surround right channel was well known in the art at the time of filing as taught by Aarts. Aarts teaches on a surround left channel and a surround right channel being fed into a localization means. Hayakawa does not specify what type of signals B1, and B2 are so they can be surround signals. Using B1 and B2 as surround channels would read on "supplying the same signal for creating virtual sound sources to the front left speaker and the front right speaker so as to create the surround left sound source and the surround right sound source to both the first listener and the second listener. Thus it would have obvious to one of ordinary skill in the art at the time of the invention to make B1 and B2 a surround left channel and surround right channel for the benefit of giving the listeners better quality sound.

Regarding claim 2, Hayakawa discloses a sound reproduction apparatus comprising recording sound B1 and B2; a first passenger (L1) and a second passenger (L2); three loudspeakers (3a, 3b, 3c) located in a line with passenger L12 front left and right together with passenger L1 front left and right with 3b being the center speaker (See Figure 8); a reverse filter network (5), the localization means, including transfer characteristics H11, 12, H21, and H22 that interposes between the sound information recording means and the sound production means and cross-talk between these sound production means and audience could be eliminated based on is based on sound transfer characteristic between two or more loudspeakers ; and one output supplied to the left and right speaker (3a and 3c) respectively, and another output supplied to the

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center loudspeaker (3b) (See Figure 8). Although, Hayakawa teaches on the above elements he fails to disclose resulting signals generated by mixing the surround left and surround right channel signals being supplied to a virtual localization processing means as a first monophonic signal and a second monophonic signal. However, the concept of resulting signals generated by mixing the surround left and surround right channel signals being supplied to a virtual localization processing means as a first monophonic signal and a second monophonic signal filing as taught was well known in the art at the time of by Aarts. Aarts teaches on an audio reproduction system using the device comprising a monaural surround signal (S) that is converted by a conversion device (200) into left channel and right channel surround signals (column 4, line 65), respectively S_l and S_r. The surround signals S_l and S_r are then supplied to a localization means. Two monophonic signals are produced. It is equivalent to mixing the surround left channel signal and the surround right channel signal and supplying them as monophonic signals to a virtual localization means. Replacing Hayakawa's method of supplying the signals with Aart's method of supplying monophonic signals reads on " wherein resulting signals generated by mixing the surround left channel signal and the surround right channel signal are supplied to a virtual localization processing means as a first monophonic signal and a second monophonic signal while the front left channel signal, the front center channel signal and the front right channel are supplied respectively to the front left speaker, the front center speaker and the front right speaker" , "wherein a first virtual localization output of the virtual localization processing means is supplied to the front left speaker and the front right speaker" and "wherein a second virtual localization output of the virtual localization processing means is supplied to the front center speaker". It would have been obvious to one of ordinary skill in the art at the time of

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the invention to replace Hayakawa's way of supplying the signals with Aart's method of supplying monophonic signals for the benefit of increasing the sound image.

All elements of claims 3-5 are comprehended by claim 2. Therefore claims 3-5 are rejected for reason stated above apropos of claim 2.

Regarding claim 7, Hayakawa discloses a sound reproduction apparatus comprising recording sound B1 and B2; a first passenger (L1) and a second passenger (L2); three loudspeakers (3a, 3b, 3c) located in a line with passenger L12 front left and right together with passenger L1 front left and right with 3b being the center speaker (See Figure 8); a reverse filter network (5), the localization means, including transfer characteristics H11, 12, H21, and H22 that interposes between the sound information recording means and the sound production means and cross-talk between these sound production means and audience could be eliminated based on is based on sound transfer characteristic between two or more loudspeakers ; and one output supplied to the left and right speaker (3a and 3c) respectively, and another output supplied to the center loudspeaker (3b) (See Figure 8). Hayakawa's Figure 8 indicates that one output signal contains the left signal and a localization output and is supplied to both the left and right speaker (3a, and 3c) and the other output signal contains the right signal and is supplied to the center speaker only. Although, Hayakawa teaches on the above elements he fails to disclose resulting signals generated by mixing the surround left and surround right channel signals being supplied to a virtual localization processing means as a first monophonic signal and a second monophonic signal. However, the concept of resulting signals generated by mixing the surround left and surround right channel signals being supplied to a virtual localization processing means as a first monophonic signal and a second monophonic signal filing as taught was well known in the art at

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the time of by Aarts. Aarts teaches on an audio reproduction system using the device comprising a monaural surround signal (S) that is converted by a conversion device (200) into left channel and right channel surround signals (column 4, line 65), respectively S_L and S_R. The surround signals S_L and S_R are then supplied to a localization means. Two monophonic signals are produced. It is equivalent to mixing the surround left channel signal and the surround right channel signal and supplying them as monophonic signals to a virtual localization means. Replacing Hayakawa's method of supplying the signals with Aart's method of supplying monophonic signals reads on "wherein resulting signals generated by mixing the surround left channel signal and the surround right channel signal are supplied to a virtual localization processing means as a first monophonic signal and a second monophonic signal while the front left channel signal, the front center channel signal and the front right channel are supplied respectively to the front left speaker, the front center speaker and the front right speaker", "wherein a signal at least containing the front left channel signal and a first virtual localization output of the virtual localization processing means is output as a signal for the front left speaker", "wherein a signal at least containing the front right channel signal and a first virtual localization output of the virtual localization processing means is output as a signal for the front right speaker" and "wherein a signal at least containing the front center channel signal and a second virtual localization output of the virtual localization processing means is output as a signal for the front center speaker". It would have been obvious to one of ordinary skill in the art at the time of the invention to replace Hayakawa's way of supplying the signals with Aart's method of supplying monophonic signals with Hayakawa's sound reproduction apparatus for the benefit of increasing the sound image.

All elements of claims 8, 10 and 11 are comprehended by claim 7. Therefore claims 8 and 11 are rejected for reasons stated above apropos of claim 7.

Claim 14 claims the surround signal-processing device of claim 7. As stated above apropos of claim 7, the combination of Hayakawa and Aarts meets all elements of that claim. Therefore, the combination meets all elements of claim 14 with the exception that the virtual localization processing means comprises a first filter means, performing a processing upon receipt of the first monophonic signal, a second filter means, performing a processing upon receipt of the first monophonic signal, a third filter means, performing a processing upon receipt of the second monophonic signal, a fourth filter means, performing a processing upon receipt of the second monophonic signal, a first adding means, adding outputs of the first filter means and that of the fourth filter means so as to produce the first virtual localization output and a second adding means, adding outputs of the second filter means and that of the third filter means so as to produce as the second virtual localization output. Hayakawa 's sound production apparatus, as seen in Figure 8, teaches of first and second filters, H11 and H12, that perform processing on a left signal, and of third and fourth filters, H22 and H21, that perform processing on a right signal. He also teaches of two adding means, one adding outputs of the first and fourth filter, H11 and H21, the other adding outputs of the second and third filters, H12 and H22. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to use Hayakawa's sound reproduction apparatus for the benefit of creating a better sound image and localizing sound to two listeners.

Claim 24 claims the surround signal-processing device of claim 7. As stated above apropos of claim 7, the combination of Hayakawa and Aarts meets all elements of that claim.

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Therefore, the combination meets all elements of claim 24 with the exception that the device further comprises an amplitude adjusting means for compensation and a compensation filter means, each for compensating differences in characteristics between the front right speaker and front left speaker. Hayakawa's sound reproduction apparatus, as shown in Figure 8, further teaches of amplifiers 4a, 4b, 4c which read on "one of an amplitude adjusting means for compensation". Compensate means to offset or counterbalance. The filters used in the localization process are thus interpreted to be compensation filters. This reads on "a compensation filter means, each for compensating difference in characteristics between the front right speaker and front left speaker". It would have been obvious to one of ordinary skill in the art at the time of the invention to use the amplifiers and filters for the benefit of balancing the sound between speakers.

3. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hayakawa (JP 6165298) in view of Aarts et al. (U.S. Patent 6,084,970) in further view of Markow et al. (U.S. Patent 6,175 489)

Claim 6 claims the surround processing system of claim 2. As stated above apropos of claim 2, the combination of Hayakawa and Aarts meets all elements of that claim. Therefore, the combination meets all elements of claim 6 with the exception that the system comprises a display device for displaying images thereon, and wherein at least the front speaker is built in the display device. Markow discloses a stereo speaker system with the speakers or mounted in the front side of the display for portable computers. It would have obvious to one of ordinary skill in the art at the time of the invention to use the resulting sound reproduction apparatus, from the combination of Hayakawa and Aarts, for Markow's onboard speaker systems for portable

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computers for the benefit of achieving better sound quality for users of PC's and portable computers.

4. Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayakawa (JP 6165298) in view of Aarts et al. (U.S. Patent 6,084,970) in further view of Iida et al. (U. S. Patent 5,844, 993).

Regarding claim 9, Hayakawa discloses a sound reproduction apparatus comprising recording sound B1 and B2; a first passenger (L1) and a second passenger (L2); three loudspeakers (3a, 3b, 3c) located in a line with passenger L12 front left and right together with passenger L1 front left and right with 3b being the center speaker (See Figure 8); a reverse filter network (5), the localization means, including transfer characteristics H11, 12, H21, and H22 that interposes between the sound information recording means and the sound production means and cross-talk between these sound production means and audience could be eliminated based on is based on sound transfer characteristic between two or more loudspeakers ; and one output supplied to the left and right speaker (3a and 3c) respectively, and another output supplied to the center loudspeaker (3b) (See Figure 8). Hayakawa's Figure 8 indicates that one output signal contains the left signal and a localization output and is supplied to both the left and right speaker (3a, and 3c) and the other output signal contains the right signal and is supplied to the center speaker only. Although, Hayakawa teaches on the above elements he fails to disclose resulting signals, one of the which is generated by performing a subtract processing on the front left channel signal and the front right channel signal and the other is generated by adding the surround channel signals, are supplied to a virtual localization processing means as a first monophonic signal and a second monophonic signal. However the concept of resulting signals,

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one of the which is generated by performing a subtract processing on the front left channel signal and the front right channel signal and the other is generated by adding the surround channel signals, are supplied to a virtual localization processing means as a first monophonic signal and a second monophonic signal was well known in the art at the time of filing as taught by Iida. Iida discloses a surround signal processing apparatus comprising a sound image localization apparatus, as well as a signal processing apparatus having a comb filter to render mutually non-correlative, a left-right pair of rear surround signals based on the monaural rear surround sound signal input (See Figure1). The resulting signals are fed into a localization means. It is obvious that this processing can be based on a monaural front surround sound as well. Iida teaches that the comb filter has a delay circuit (1a) that adds a delay to the input surround signal S, and outputs it as delay signal T; a summing circuit 1b that obtains a sum signal (S+T) by adding delay signal T to base surround S, and outputs the result as the L channel rear surround signal SL; and a subtraction circuit 1c that obtains a difference signal (S-T), by subtracting delay signal T from base surround signal S, and outputs the result as the R channel rear surround signal SR. Using Iida's comb filter manner of inputting the signals into the localization apparatus to replace Hayakawa's manner of inputting signals into the localization means, Hayakawa's sound reproduction apparatus having a left, right and center speaker reads on "wherein resulting signals, one of the which is generated by performing a subtract processing on the front left channel signal and front right channel signal and the other is generated by adding the surround channel signals, are supplied to a virtual localization processing means as a first monophonic signal and a second monophonic signal", "wherein signals at least containing a signal capable of being obtained by providing a delay in time substantially equal to that of the virtual localization

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processing means on the front left channel signal and a first virtual localization output of the virtual localization processing means, are output as a signal for the front left speaker”, “wherein signals at least containing a signal capable of being obtained by providing a delay in time substantially equal to that of the virtual localization processing means on the front right channel signal and a first virtual localization output of the virtual localization processing means, are output as a signal for the front right speaker”, and “wherein signals at least containing a signal capable of being obtained by providing a delay in time substantially equal to that of the virtual localization processing means on a resulting signal generated by adding the front left channel and the front right channel and a second virtual localization output of the virtual localization processing means, are output as a signal for the front center speaker”. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to replace Hayakawa’s manner of inputting signals with Iida’s manner of inputting signals for the benefit of achieving improved sound field control that enhances the naturalness of the sound.

All elements of claim 12 are comprehended by claim 9. Therefore claim 12 is rejected for reason stated above apropos of claim 9.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hayakawa (JP 6165298) in view of Aarts et al. (U.S. Patent 6,084,970) in further view of Iida et al. (U. S. Patent 5,844,993).

Claim 13 claims the surround signal-processing device of claim 7. As stated above apropos of claim 7, the combination of Hayakawa and Aarts meets all elements of that claim. Therefore, the combination meets all elements of claim 13 with the exception that the first monophonic signal and the second monophonic signal are supplied to the virtual localization

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mean after performing a reduce correlation in which correlation between the first monophonic signal and the second monophonic signal is reduced. Iida discloses a surround sound processing apparatus that uses a comb filter method of inputting monophonic signals into a localization means. The comb filter manner is used to reduce correlation between the left and right signals. (column 2, line 5). Replacing Aarts manner of inputting monophonic signals into a localization means with Iida's method of inputting monophonic signals into a localization means reads the claimed manner. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to use Iida's manner of inputting monophonic signals into a localization means to achieve improved sound field control and create a feeling of expansiveness.

Claim Objections

4. Claims 15-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devona E. Faulk whose telephone number is 703-305-4359. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen can be reached on 703-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

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XU MEI
PRIMARY EXAMINER